

Ram Island Restoration Project 2000
Final Report

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25 October 2000

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This is a summary of restoration activities for Common (*Sterna hirundo*) and Roseate (*S. dougallii*) Terns on Ram Island, Mattapoisett, MA for the 2000 field season.

Personnel

Activities for the 2000 field season on Ram Island were directed by Shelagh Parken, Site Manager. Jennifer Mattice was the full time field assistant for the duration of the project. Jill Turner was the part time field assistant from 5 June to 12 July. Dr. Jeremy Hatch, Dr. Ian Nisbet, Brad Blodget, Doug Watson and Connie Adams came to the island to help on one or more days. Margaret Friar and Courtney Redmond were on island from 23 June to 27 June conducting research as part of Margaret Friar's PhD research through the SUNY, Albany. The Massachusetts Audubon Society provided volunteers and paid assistants on 13 June and 5, 7 and 9 July for the Roseate Tern Census and for mass banding of chicks.

Transportation

Transportation to and from Ram Island was via boat. In the early part of the field season, a 17' Dixie was used. On 31 May, the Dixie was replaced by the new 17' Whaler. The Dixie was retained as a back up unit and used on several occasions. In total, 67 trips were made to Ram Island, 32 with the Dixie and 35 with the Whaler. Bob Ringuette at Ringuette's Leisure Shores Marina provided a slip and storage space for the second boat.

Field Season

Ram Island was visited on 4 and 8 May and then consistently every day from 10 May to 13 July and again on 2 August. No trips were made to the island on 20 May, 6 June, and 11 June due to lack of personnel, inclement weather and boat failure, respectively. A total of 67 trips were made to the island on 65 days.

The 2000 field season was cool and wet. However, there was no weather related mortality. High spring tides washed out 5 study nests on 2 June and 2 study nests on 30 June. Approximately 50 additional non-study Common Tern nests and 1 Least Tern nest were also washed out on 2 June. It should be noted that there was a big Nor'easter on 6 June. However, this did not cause any loss of nests as all nests close to the high tide mark were washed out on 2 June.

Management Activities

Vegetation on Ram Island was dense this season as the island was not washed over in winter storms. In an attempt to open up the vegetation for breeding terns, strips of vegetation were mowed on 8 May targeting *Rosa rugosa* and *Phragmites communis*. On 17 May, strips of vegetation that had been mowed were sprayed with the herbicide "Round Up" to prevent regrowth. Patches of unmowed *Rosa rugosa* were sprayed at the periphery to prevent further spreading. On 28 May a second round of herbicide was applied. Two applications of herbicide was very effective in preventing regrowth and spreading of *Rosa rugosa*, plants that were sprayed only once slowed only marginally in growth. Thus it is recommended that at least two applications be used in the future.

Nest boxes were distributed in Roseate Tern nesting areas prior to the start of the egg laying period. Once Common Tern chicks started to hatch, chick shelters were distributed near Common Tern nests with little shade. Garbage such as rope, fishing line and plastic debris was regularly removed from the breeding areas. No gulls attempted to nest on the island and therefore gull harassment was not required. Two groups of visitors were given a tour on 12 July.

On 18 June, rodenticide was distributed throughout the island in areas of dense vegetation as discussed in the proceeding Predation section.

Nesting Chronologies

Details of Common and Roseate Tern nesting chronologies are detailed in Table 1.

Common Terns

Common Terns were present on Ram Island at our arrival on 4 May. At this time, they were not present in the nesting area but were staging on the beach and rocks. By 10 May, they were seen in the nesting area and the first egg was found on 12 May. In the Common Tern study plots, the last nest was initiated on 25 June and the clutch completed on 26 June. Thus in the study plots, the egg laying period was 44 days from 12 May to 25 June. However, nests outside of the study plots were still initiated for several more days. Based on 339 nests in the study plots, the median date of clutch initiation was 22 May. The first chick hatched in the study plots on 4 June, and the first chick hatched in the study sub-plots was 5 June. The last chick in our study sub-plots hatched on 6 July. However, chicks were still hatching in other parts of the island up to our departure on 13 July. Based on 66 nests in the study sub-plots the median hatch date of A chicks was 13 June.

Roseate Terns

Staging Roseate Terns were present on Ram Island at our arrival on 4 May. Roseate Terns were observed in the nesting area on 14 May and the first nest was found on 15 May. The last nest was initiated and completed on 23 June. Thus in the study plots, the egg laying period was 40 days from 15 May to 23 June. Note new nests were observed in other areas of the island up to July 9. Based on 173 nests in the study plots, the peak date of clutch initiation was 27 May. The first Roseate chick hatched on 8 June. The last chick to hatch in our study plots was on 7 July. Seven nests had not completed the incubation period by our departure. Based on the nests that hatched prior to our departure, the peak hatch date of A chicks was 18 June.

Annual Nest Census

Common Terns

On 8 and 9 June, 1707 Common Tern nests were counted. Nest counts were performed visually for each grid square by three people. Abandoned nests were not counted. There were an additional 323 nests in the study plots for a total of 2030 nests in the A period. On 6 July, 129 nests were counted in the B period census. At this time there were 16 new nests in the study plots. About 50 of these nests were renesters that had been washed out in a seasonal high tide on 2 June. Thus the estimate for the B period census is 95 nests. The total count of Common Tern nests on Ram Island, 2000 is 2125 nests. This is 120 more nests than 1999 (Tims 1999).

Roseate Terns

On 13 June, 681 one and two egg clutches, 22 3-egg clutches and 6 4-egg clutches were counted on Ram Island. These counts were performed visually and by searching through vegetation in each grid square by five people. Abandoned nests were not counted. The vegetation on Ram Island was very dense. It is estimated that approximately 10% of the nests were missed in the census. To compensate, an additional 68 nests were added to the counted nests for a total of 777. In five grid squares the vegetation was too thick to count nests so nests were estimated by flushing. This yielded 43 nests. An intensive search of one of these squares demonstrated an underestimation of 10%. Thus 5 nests were added to the flushed grid squares for a total of 48 nests. There were 163 nests in the study plots. Nests that were abandoned within 10 days after the census date were still counted. The B period census was conducted on 5, 7, 9 and 11 July. It was estimated that there were 131 nests plus 10 nests in the study plots for a B Period total of 141 nests. Thus the total count of Roseate Tern nests on Ram Island, 2000 was 1129 nests. This is a 62% increase from the 696 nests reported in 1999 (Tims 1999).

Adult Trapping and Band Reading

Common Terns

Between 30 May and 26 June, Common Terns were trapped using walk-in treadle traps. An attempt was made to trap every bird on each nest in the sub-plots, and at least one bird on each nest in the study plots. An attempt was made to trap a second bird on a nest in the study plots when the first bird was banded. A total of 215 Common Tern adults were trapped, of which 101 (46.7%) of these birds were banded. All banded birds were measured and released. Unbanded birds were released without processing.

Roseate Terns

Between 7 June and 8 July, Roseate Terns were trapped using walk-in treadle traps. Two attempts were made to trap birds on each nest. When possible, an attempt was made to trap the second bird on the nest. In total, 109 Roseate Terns were trapped, 67 (61.5%) of these were previously banded. All birds were measured and blood was sampled from the tarsus vein in the majority of birds. Birds that were previously unbanded, were banded with a Bird Banding Lab (BBL) band on the left leg and a Field Readable band on the right leg. Birds that were trapped and had only a BBL band received Field Readable band.

Between 3 June and 28 June Field Readable bands were read from birds perched in the nesting area. In this period, 592 observations were made from 196 individuals. Between 2 July and 12 July bands were read from birds perched on the rocks. In this period, 329 observations were made from 124 individuals. In total, 921 observations were made of 320 individuals. When trapped birds were added, 388 individuals had been identified on Ram Island.

Chick Banding

Common Terns

All Common Tern chicks in the study sub-plots were banded on their hatch day. In addition, Common Tern chicks were mass banded from 8 June to 11 July with a concentrated effort on 5, 7, 9 and 11 July. In total, 1166 Common Tern chicks were banded.

Roseate Terns

All Roseate Tern chicks in the study plots were banded on their hatch day. In addition, Roseate Tern chicks were mass banded 5, 7, 9 and 11 July. In total, 667 Roseate chicks were banded.

Breeding Success and Productivity

Common Terns

Three study plots were chosen for study of Common Terns. These three plots were selected to be representative of Common Tern nests in space and time. A total of 339 nests were counted and followed in these plots until egg laying was complete. In each plot, a smaller sub-plot was fenced to allow study of Common Tern chicks. The coordinates of the study plots and sub-plots are given in table 3.

In the study sub-plots there was a total of 66 nests. From these nests, the hatching success was calculated as 91% (Table 2) and the fledging success as 55%. A chick was considered to survive if it reached 80g by day 18. If a chick was less than 18 days old at our departure it was predicted to survive if its weight showed a steady increase daily. The productivity of Common Terns was 1.09 chicks/pair, which is only slightly higher than the 1999 value of 1.01 (Tims 1999).

Roseate Tern

Three study plots were chosen for study of Roseate Terns. These plots were selected to be representative of breeding Roseate Terns in space and time. A total of 173 nests were counted. However, the data is only considered from 145 as 20 were abandoned and 7 were still being incubated at the time of our departure. From these nests, the hatching success was calculated as 79.6% and the fledging success as 86.1%. All A chicks were predicted to survive if not found dead and B chicks were predicted to survive if 16.8g or more by day 2 and not found dead. Fledging success was higher in 2000 than in 1999 (81%) but lower than 1998 (89%) (Tims 1999). Productivity of Roseate Terns was 1.11 chicks/pair. However, given the large increase in the total number of nests, the total number of fledged chicks this year will be greater than recent previous years.

PREDATION

This season Ram Island had moderate predation emanating from three sources; Ruddy Turnstones, rats and Great Black-backed Gulls. During the laying period, broken eggs were frequently found through out the colony. It is suspected this is the action of Ruddy Turnstones and/or rats.

Up to 6 Ruddy Turnstones frequently visited Ram Island between 8 May and 4 June. During this period a few broken eggs were regularly found in the nesting area. Direct predation of eggs by turnstones was not observed. However, on 23 May one turnstone was observed entering the Common Tern nesting area and was flushed out by the field crew.

On 8 May, unidentified tracks and a short tailed shrew were found by Dr. Hatch. However, it should be noted that shrews are not predators. On May 10, mammalian feces were found in and around the tent platform. The scat sample was sent to Massachusetts Division of Fish and Wildlife for examination by Tom French. At this time, it was thought an overwintering muskrat left the scat. No further signs of muskrat activity were confirmed.

Between 22 May and 5 July, 8 caches of both Common and Roseate Tern eggs were discovered. One additional cache was found with broken Willet eggs and dead Willet chicks. At this point we began to suspect a rat. The caches varied in size from 3 to 9 eggs. Egg caches contained both broken and unbroken eggs. Where the eggs were broken, eggs were broken in half and pried open in a manner similar to how one cracks an egg for cooking. The contents of the eggs were either completely missing, partially missing, or intact. Caches were distributed through out the island in areas of dense vegetation. Note that areas of dense vegetation also coincide with areas of nesting Roseate Terns.

On 18 June, rodenticide was distributed through out the island in areas of dense vegetation. Sixteen packages of "D-Con ready mixed bait bits" containing 0.005% Brodifacoum and four packages of "Kills Mice" containing 0.005% Chlorophacinone were used.

On 22, 25 and 26 June, two Great Black-backed Gulls appeared at Ram Island. The majority of terns flushed off the colony but the gulls were not seen landing on the island. On 9 July, a juvenile Great Black-backed Gull was observed in the Common Tern nesting area with a chick in its bill. A Juvenile Great Black-backed Gull and two adult Great Black-backed Gulls were seen landing in the Common Tern sections of the colony on 11 and 12 July. However, no gull pellets containing tern chick remnants were found on island.

Adult and Chick Mortality

Adult Terns

Over the course of the field season 5 adult Common Terns and 2 adult Roseate Terns were found dead. In all but one case, the terns were too decomposed to identify the cause of death. One freshly-dead Common Tern adult was removed from the island and later dissected by Dr. J. Hatch. The bird was identified as

female with a completely formed egg present. It is suspected that failure in the egg laying process caused death.

On 27 June, an adult Roseate Tern (0882-94712, K712) was found cold and wet with a puncture wound in its chest. It was removed from the island and eventually taken to Tufts University School of Veterinary Medicine's Wildlife Clinic and later euthanized.

Chick Mortality

Chick mortality in both Common and Roseate Terns was primarily due to starvation of B and C chicks. Predation by Great Black-backed Gulls resulted in the death of chicks. The number of chicks taken by gulls is not known but is estimated at less than 50. Two non-study Common Tern chicks flew into the fenced study sub-plot. Both chicks were pecked to death, one was found on the ground and the other tangled in the fence.

Nesting Bird Species

In addition to Roseate and Common Terns, a few other species nested on Ram Island (Table 4). These include Least Tern, Canada Goose, Willet, Common Eider, Song Sparrow, Mallard, American Oystercatcher and Killdeer. It is also suspected that Gadwall, Spotted Sandpiper and Saltmarsh Sharp-tailed Sparrow nested on Ram Island. These three species were regularly observed near the same place on the island but nests were never located.

Literature Cited

Tims, J. 1999. Ram Island Restoration Project 1999. Final Report. Massachusetts Division of Fisheries and Wildlife. Westborough, MA. 14pp.

Table 1. Common and Roseate Tern Nesting Chronologies, Ram Island 2000

PARAMETER	COTE	ROST
Nests in study plots	339	173
Egg laying period ^a	12 May - 25 June	15 May – 23 June
Median clutch initiation date	22 May	27 May
First chick	4 June	8 June

^aEgg laying period: date of first laid A egg to last laid A egg in study plots.

Table 2. Common and Roseate Tern Breeding Success at Ram Island in 1999.

PARAMETER	COTE	ROST
Number of study nests	66	145*
Number of eggs laid	144	235
Eggs/nest (mean)	2.18	1.62
Number of eggs hatched	131	187
Hatchlings/nest (mean)	1.98	1.29
Number of chicks fledged	72	161
Hatching success (%) ^a	91.0	79.6
Fledging success (%) ^b	55.0	86.1
Productivity ^c	1.09	1.11

*Excludes 20 nests that were abandoned immediately after egg laying and 7 nests not completed incubation period by departure date

^a Hatching success: eggs hatched divided by number of eggs

^b Fledging success: chicks fledged or predicted to survive divided by eggs hatched.

^c Productivity: the number of birds fledged or predicted to survive divided by study nests.

Table 3. Study Plot and Sub-Plot Coordinates of Common and Roseate Terns

	Study Plots	Study Sub-Plots
Cote Plot C	C.0:0.5, C.0:1.0, E.0:0.5, E.0:1.0	D.0:0.5, C.8:0.6, E.9:0.9, D.4:0.9, D.8:1.0, D.7:0.6
Cote Plot O	O.0:0.0, O.0:2.0, P.0:0.0, P.0:2.0	O.1:0.9, O.5:1.0, 0.6:1.7, O.3:1.8, O.1:1.6
Cote Plot R	R.5:5.0, R.5:7.0, S.0:5.0, S.0:7.0	S.4:5.0, S.3:4.9, S.1:5.0, S.1:5.4, S.2:5.6, S.3:5.5, S.4:5.5, S.4:5.1
Rost Plot E	E.0:3.3, E.3:2.6, D.5:2.5, C.8:3.2	NA
Rost Plot K	L.3:7.1, L.8:6.3, L.6:5.9, L.0:5.5, K.1:5.8, K.0:6.0	NA
Rost Plot Q	Q.0:5.0, Q.0:7.0, R.0:5.0, R.0:7.0	NA

*Note: points are based on a 10m by 10m grid. Lettered coordinates run north to south and numbered coordinates run west to east (starting at 00, 0, 1, ...). The A.0, 0.0 point is at the sign post at the northwest corner of the island (i.e., near the mooring).

Table 4. Bird Species Nesting at Ram Island in 2000.

Species	Nests	Clutch Size (mode)	Successful ^a	Comments
Canada Goose	4	No data	T	One nest observed with 3 chicks
Willet	8	4	T	One nest depredated by rats
Mallard	2	7	T	
Common Eider	1	4	T	Observed on water with 4 chicks
Song Sparrow	2	4	T	
American Oystercatcher	3	3	T	
Killdeer	2	3	T	
Least Tern	1	2	F	Washed out in tide 2 June
Saltmarsh Sharp-tailed Sparrow	1	No data	No data	Male adult found dead near suspected nest site. Suspected nest ^b
Gadwall	1	No data	No data	Suspected nest ^b
Spotted Sandpiper	1	No data	No data	Suspected nest ^b

^aSuccessful: Nest were considered successful if one chick hatched

^bSuspected Nest: Nests were not found, continued observations of birds traveling to and flushing from same area suggests nests were present.